

Non Intrusive, On-line, Simultaneous Multi-Species Impurity Monitor in Hydrogen, Phase I

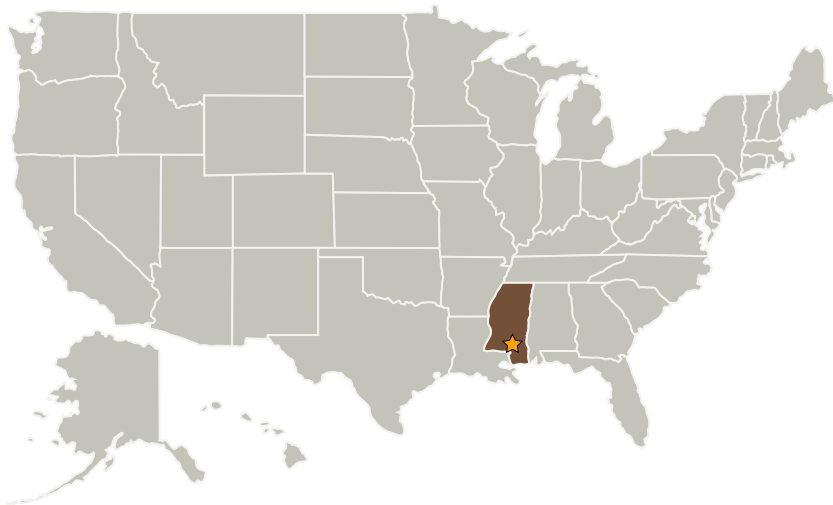
Completed Technology Project (2008 - 2009)



Project Introduction

The purity of hydrogen fuel is important in engine testing at SSC. The hydrogen may become contaminated with nitrogen, argon, or oxygen. The hydrogen from the fuel tanks or feed lines is analyzed beforehand. Therefore, there is a need for a non-intrusive, on-line, near real-time monitor for H₂. The analytical technique should measure various impurities (molecular and atomic) simultaneously and be easy to implement in the field. The objective of this proposed research is to develop an analytical technique based on Laser Induced Breakdown Spectroscopy (LIBS) to measure simultaneously the concentrations of nitrogen (N₂), argon (Ar) and oxygen (O₂) contaminants in hydrogen (H₂) gas storage tanks and supply lines. Advanced sensors for monitoring multiple species in H₂ feed-lines and storage tanks will be useful before engine testing and will increase understanding of engine performance. Phase I will provide necessary information to build an improved prototype in Phase II, with better sensitivity and ease of implementation at NASA/SSC. In Phase II, a prototype LIBS system will be developed to measure impurities in H₂ fuel at different places in the H₂ feed line. This system will be delivered to NASA/SSC at the end of Phase II.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission
Directorate (STMD)

Lead Center / Facility:

Stennis Space Center (SSC)

Responsible Program:

Small Business Innovation
Research/Small Business Tech
Transfer

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Organizations Performing Work	Role	Type	Location
★Stennis Space Center(SSC)	Lead Organization	NASA Center	Stennis Space Center, Mississippi
Mississippi Ethanol, LLC	Supporting Organization	Industry	Winona, Mississippi

Primary U.S. Work Locations

Mississippi

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX14 Thermal Management Systems
 - └ TX14.1 Cryogenic Systems
 - └ TX14.1.2 Launch Vehicle Propellant